

*A1* *concluded* wherein  $d\Delta n$  is in the range of  $0.29-0.36\mu m$ , where  $d$  is the thickness of said liquid crystal layer, and  $\Delta n$  is the refractive anisotropy of the liquid crystal molecule. *B*

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### REMARKS

The specification has been amended to correct minor spelling and grammar errors. No question of new matter arises and entry of the amendments is respectfully requested.

Claims 1 - 24 are before the Examiner for consideration. Claims 23 and 24 have been added by this Amendment.

#### Rejections under 35 U.S.C. §103(a)

Claims 1 - 3, 8, 12 - 14 and 19 have been rejected under 35 U.S.C. §103(a) as obvious over unexamined Japanese Patent Application JP No. 6-160878. Claims 4 - 7, 9 - 11, 15 - 18 and 20 - 22 have been rejected under 35 U.S.C. §103(a) as obvious over unexamined Japanese Patent Application JP No. 6-160878 as applied to Claims 1 - 3, 8, 12 - 14 and 19, and further in view of Yanagawa *et al.* (US Patent No. 5,870,160) and Kang *et al.* (US Patent No. 5,464,669).

Specifically with respect to claims 1 - 3, 8, 12 - 14 and 19, the Examiner held that the Japanese application discloses "a LCD device similar to that of the instant claims except for  $d\Delta n$  being in the range of  $0.21 - 0.36\mu m$ , as compared to the claimed range of  $0.29 - 0.36\mu m$ . Thus, the claimed range lies inside the range disclosed by the prior art. However, it has been held that in the case where the claimed ranges 'overlap or lie inside ranges disclosed by the prior art' a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)." Office Action, Paper No. 6, at page 2.

Applicants respectfully traverse this rejection in view of the following remarks. In the

Office Action, the Examiner has overlooked the dictum in *In re Wertheim* where the CCPA explained "that ranges which overlap or lie inside ranges disclosed by the prior art may be patentable if the applicant can show criticality in the claimed range by evidence of unexpected results." *Wertheim* at 267, 191 U.S.P.Q. (BNA) at 100 (citing *In re Malagari*, 499 F.2d 1297, 182 U.S.P.Q. (BNA) 549 (C.C.P.A. 1974); *Orfeo*, 440 F.2d 439, 169 U.S.P.Q. (BNA) 487 (C.C.P.A. 1971)) 541 F.2d 257, 191 U.S.P.Q. (BNA) 90 (emphasis added).

Even accepting *arguendo* the Examiner's assertion of a *prima facie* case of obviousness, the specification (as amended) points out that "JP No. 6-160878 only discloses  $d\Delta n$  considering the light transmittance in the liquid crystal layer. The conventional TFT-LCD (thin film transistor-liquid crystal display) including *JP No. 6-160878* does not disclose a desirable  $d\Delta n$  that considers the effect of color-shift." Specification, p. 5 lines 4-7 (emphasis added). The present disclosure indicates that the claimed  $d\Delta n$  is critical, as it includes consideration of color-shift that was absent in the prior art. Furthermore, even though the phenomenon of color-shift was known at the time of the disclosure JP No. 6-160878, color-shift was not discussed with respect to any range of  $d\Delta n$ , even though the range of desirable  $d\Delta n$  was discussed in the disclosure. Therefore, any discovery of a specific range of  $d\Delta n$  that significantly *affects color-shift* may be considered as unexpected results.

Furthermore, in *In re Woodruff*, the US Court of Appeals for the Federal Circuit held subsequent to *Wertheim* that "[t]he law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

According to the MPEP, “[e]vidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut prima facie obviousness. “Evidence that a compound is unexpectedly superior in one of a spectrum of common properties . . . can be enough to rebut a *prima facie* case of obviousness.” No set number of examples of superiority is required. *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987) (Evidence showing that the claimed herbicidal compound was more effective than the closest prior art compound in controlling quackgrass and yellow nutsedge weeds in corn and soybean crops was sufficient to overcome the rejection under 35 U.S.C. 103, even though the specification indicated the claimed compound was an average performer on crops other than corn and soybean.). MPEP § 716.02(a) (emphasis added).

The criticality of the claimed  $d\Delta n$ , and the reason for distinguishing the claimed  $d\Delta n$  from the range disclosed by the prior art is well documented in the specification. The range of  $d\Delta n$  claimed in the present invention is distinguished from the range disclosed in the prior art, in that the present invention claims only the range of  $0.29 - 0.36 \mu\text{m}$  *for its effect on color-shift*, whereas the prior art claims the range of  $0.21 - 0.36 \mu\text{m}$  *for its light transmittance*. This is graphically depicted in the specification in Fig. 3, and discussed in detail in the specification. For example, at p. 5, lines 16 – 17, the specification discloses that an “object of the invention is to provide an LCD that prevents color-shift.” The specification further addresses this object at p. 9, lines 5 - 6, where it states “. . .  $d\Delta n$  is chosen to prevent color-shift. Moreover, the  $d\Delta n$  is chosen to maintain white color balance.” The criticality of the claimed  $d\Delta n$  is further explained in the specification:

If  $d\Delta n$  is in the range of  $0.21 \mu\text{m} - 0.29 \mu\text{m}$ , it is impossible to display the preferable white color. However, in the present invention,  $d\Delta n$  is in the range of  $0.29 \mu\text{m} - 0.36 \mu\text{m}$  and all points are in the inner region of the dotted line rectangle [of Fig. 3].

In accordance with the present invention , it is possible to increase the light transmittance by controlling the refractive anisotropy of the liquid crystal molecule and the thickness of the liquid crystal layer.

Further, it is possible to prevent color-shift in the LCD of the present invention, especially white color-shift. . . . Preferably,  $d\Delta n$  of the present invention is in a range of 0.29 – 0.36 , thereby preventing the LCD from color-shift, especially white color-shift.

Specification, p. 9, line 18 - p. 10, line 9.

In view of the above, Applicants submit that the present invention is not obvious over unexamined Japanese Patent Application JP No. 6-160878, either alone or as applied to claims 1 - 3, 8, 12 - 14 and 19, and further in view of Yanagawa *et al.* (US Patent No.5,870,160) and Kang *et al.* (US Patent No. 5,464,669). Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

### CONCLUSION

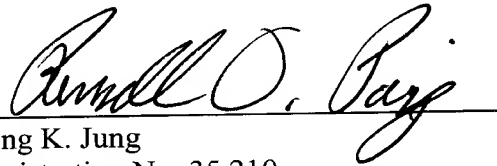
In light of the above, Applicants believe that this application is now in condition for allowance and therefore request favorable consideration and prompt allowance of the pending claims.

If the Examiner deems that a telephone conference would further the prosecution of this Application, the Examiner is invited to contact the undersigned representative at the telephone number listed below.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-0911.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Song K. Jung", written over a horizontal line.

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